

Maternal-fetal Bonding Among Pregnant Women Attending Prenatal Care: An Ecological Model

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Research Problem

Women often reduce alcohol or drug use during pregnancy (Smith, Lancaster, Moss-Wells, Coles, Falek, 1987) because of concerns for the fetus (Reading, Campbell, Cox, Sledmere, 1982). These concerns are expressions of maternal-fetal bonding, and are the foundation of caregiving behaviors (Steele & Steele, 1994). Classical attachment theory suggests that the construction of the self as caregiver depends on a woman's past experience of caregiving (George & Solomon, 1996). Current theory (George & Solomon, 1999) posits that caregiving behavior is part of a complex caregiving-behavioral system. George and Solomon argue that applying ecological theory (Bronfenbrenner, 1979) is the next step to understanding caregiving. An ecological model suggests that bonding depends upon interactions of the whole biopsychosocial system (Belsky, 1999). The following study was designed to address gaps in the prenatal caregiving literature and to articulate the relationship between maternal-fetal bonding and biopsychosocial characteristics.

Research Questions and Hypothesis

Study aims were to: 1) Describe demographic characteristics and clinical information of a sample of pregnant women receiving prenatal care; 2) Measure the relationship of maternal-fetal bonding to pregnancy (bio), maternal (psycho) and environmental (social) characteristics; and 3) Determine the relative contribution of these variables to the maternal-fetal bond. After controlling for fetal age, the strength of the bond was predicted to depend upon characteristics of the pregnancy (knowing fetal gender), mother (drinking status, perceived nurturing by her own mother, depressed mood), and environment (social support, economic resources).

Methodology

Design and sample

This is a cross-sectional survey of 99 adult women attending prenatal care at a New York City hospital-affiliated clinic. Sampling strategy was to oversample for heavy drinkers to obtain a range of drinking statuses. Because heavy drinkers often fail to enter prenatal care early in pregnancy (Howard & Beckwith, 1996), recruitment was limited to women in their third trimester. Because American women have high rates of binge drinking (Wilsnack & Wilsnack, 1995) only women raised in the continental United States were included. Exclusion criteria included being pregnant with more than one fetus. The Institutional Review Boards at Columbia University, and each of the participating hospitals, approved this study. A Certificate of Confidentiality was obtained from the National Institutes of Health.

Variables and Measures

Dependent variable:

Maternal-fetal bonding was measured using the Maternal-Fetal Attachment Scale (MFAS) (Cranley, 1981), a 24 item, 5 point Likert scale, used with a wide range of populations. Because many women learn fetal gender, two items were eliminated asking whether names were chosen for a baby “boy” or “girl”. Cronbach’s alpha for the revised scale was .80. One subscale, Roletaking demonstrated an adequate reliability coefficient (.83) and was used.

Maternal characteristics:

Drinking status was operationalized using the Alcohol Use Disorders and Associated Disabilities Interview Schedule (AUDADIS) (Grant and Hasin, 1992). The AUDADIS has been used in several epidemiological studies. Drinking status was defined as Lifetime Abstainer (< 12 drinks ever in lifetime), Ex-Drinker (≥ 12 drinks in lifetime, but < 12 drinks during past 12 months), or Current Drinker (≥ 12 drinks during past 12 months). Average alcohol use during the past month, and during the month prior to pregnancy recognition was also measured.

Depressed mood was operationalized as a score of ≥ 16 on the Center for Epidemiological Studies Depression Scale (CES-D, Radloff, 1977). The CES-D measures depressed mood during the past week and has been used extensively with low socioeconomic samples. Two items that co-occur during depression and pregnancy (restless sleep, poor appetite) were eliminated to avoid over-diagnosis, as suggested by Hobfoll and colleagues (Hobfoll, et al., (1995). Revised scale’s alpha was comparable to the original scale (.75 versus .78).

Perceived nurturing from her own mother was measured using the Parental Nurturance Scale (PNS) (Buri, 1989), a 24-item, 5-point scale. The PNS measures

perception of parental nurturing among adolescent and adult children. It was revised for participants with poor reading comprehension. The revised version included 14-items, with a strong alpha (.95).

Pregnancy characteristics:

This construct included “fetal age” and “knowing fetal gender”. Items obtaining this information were included in the demographic questionnaire.

Environmental characteristics:

Perceived social support was measured using The Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet, et al., 1988). The MSPSS is a 12-item 7-point measure of overall perceived social support, and support from a special person, family, and friends. Cronbach’s alpha coefficient was good for overall support (.91), and for Special Person, Family, and Friends (.96, .93, and .87 respectively).

Economic resource was measured by asking participants how adequately their economic resources were since pregnant pregnancy recognition. Answers ranged from 1 (Never have enough to get by) to 6 (Always have enough to save). Data were collapsed into three categories: more than adequate, adequate, and inadequate.

Procedures

Statistics

The sample was described using standard descriptive statistics. Basic rules of statistics were applied to measure relationships between the bonding and pregnancy (fetal age, fetal gender), maternal (depressed mood, drinking status, nurturing by own mother), and environmental (social support, economic resources) characteristics. Linear regression analysis determined the relative contribution of the characteristics to the strength of the bond. SPSS 9.0 data management system was used (Norusis, 1993).

Results

Univariate analysis

Sample

The women were young ($M = 25.8$, $SD = 5.8$), and their ethnicity reflected the ethnic composition of the clinics: 55.6% African Americans, 30.3% Latina, and 14.1% “Other”. The mean maternal-fetal bonding score was 3.97 ($\pm .40$; 3.00 - 4.95), and was comparable to the normed mean ($3.78 \pm .45$).

Pregnancy characteristics: Fetal age averaged 33.4 weeks (± 4.1 ; 26 - 40); 59.2 % of sample knew fetal gender.

Maternal characteristics: Depressed mood was elevated ($M = 15.1$; ± 9.7 ; 0 - 44) compared to middle class pregnant samples (Kumar and Robson, 1984) but comparable to disadvantaged samples (Hobfoll, et al., 1995; York et al., 1992). There was a range of perceived nurturing scores ($M = 3.91$, $\pm .93$, 1 - 4.47). Lifetime Abstainers comprised 43.4% of the sample, Ex-Drinkers, 39.4% and Current Drinkers 17.2%. The large proportion of Lifetime Abstainers reflects the number of women younger than drinking age (21.2%), and the number of African American and Latina women (84.8%) who drink less than Caucasian women (NIAAA, 1997). The proportion of Current Drinkers was comparable to epidemiological finding that 15.1% of a sample of 1131 women drank while pregnant (Flynn et al., 2003). Current drinkers reduced their alcohol use after pregnancy recognition.

Environmental characteristics: Overall perceived support ($M = 5.31 \pm 1.46$), and support from family ($M = 5.50 \pm 1.25$), and friends ($M = 5.03 \pm 1.9$) were similar to normed means. Support from the Special Person was elevated ($M = 6.17$; $SD = 1.3$) compared to the normed mean. Economic resources varied from “more than adequate” 38.4%, “adequate” 42.4%, and “inadequate” 19.2% resources.

Bivariate analysis

Pregnancy characteristics: Bonding was positively related to fetal age ($p < .05$) and knowing fetal gender ($p < .001$).

Maternal characteristics: Lifetime Abstainers ($M = 3.85$, $\pm .39$) were less bonded than Current Drinkers ($M = 4.12 \pm .34$) ($p < .05$), and scored lower on Roletaking ($M = 4.22$, $SD = .47$) than either Current Drinkers ($M = 4.57$, $SD = .45$) or Ex-Drinkers ($M = 4.56$, $SD = .45$) ($p < .005$). Neither depressed mood nor perceived nurturing from the woman's own mother was related to the pregnant woman's bond to her fetus.

Environmental characteristics: Neither social support nor economic resources was related to bonding.

Multivariate analysis

Predictor variables were entered in a stepwise fashion. Depressed mood and perceived social support detracted from the model and were eliminated. The final model contained five predictor variables: fetal age, knowing fetal gender, drinking status, perceived nurturing, and economic resources. The strength of the maternal-fetal bond was predicted by “drinking status” plus “perceived nurturing” plus “knowing fetal

gender” ($F = 6.29$, $df = 4$, 94 ; $R^2 = .211$, $p < .000$). This model explained 21.1% of variance in the maternal bond. “Economic resources” was not a significant predictor of bonding.

Implications for Social Work Practice

These data suggest that the maternal-fetal bond develops in spite of depressed mood, poor social support, and inadequate economic resources, in disadvantaged, inner-city African American and Latina women. Psychodynamic interventions focused on the woman’s internal model of attachment may be more effective than a case management approach. Working through resistance to learning fetal gender may also support development of the bond. The finding that Lifetime Abstainers were less bonded than Current Drinkers is counterintuitive. These findings suggest that reducing alcohol and drug use as a component of caregiving may strengthen the maternal-fetal bond. Future research is needed to determine whether behavioral change reinforces the emotional bond. Examining bonding through an operant conditioning paradigm may provide social work practitioners with a useful intervention model. However, these findings are weakened by the limited statistical power. Future studies using larger samples are needed to increase statistical certainty.

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